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Description

Broadband Extension to an EPABX or PABX

DISCLOSURE

[0001] The invention relates to the method, architecture and interfaces that allow extensions to existing PABX or EPABX such that it will allow broadband (from several hundred kbps to several mbps) service connections to the end users of the PABX or EPABX.

[0002]

Patent Citation 1: 5,805,692 Private automatic branch exchange (PABX) system with transparent computer supported telecommunications applications (CSTA) functionality, Oerlemans et al.

Patent Citation 2: 5,896,377 Broadband or narrowband interworking, Boot et al.

Patent Citation 3: 6,324,410 Method and apparatus for interfacing a cellular fixed wireless terminal to the extension side of a PBX or PABX, Giacopelli et al.

Patent Citation 4: 6,363,079 Multifunction interface facility connecting wideband multiple access subscriber loops with various networks, Barzegar et al.

Patent Citation 5: 6,366,656 Method and apparatus for migrating embedded PBX system to personal computer, Lee et al.

Patent Citation 6: 6,430,395 Wireless private branch exchange (WPBX) and communicating between mobile units and base stations, Arazi et al.

Patent Citation 7: 6,522,663 Telecommunications network architecture for transporting fax, voice and data via an ATM switch including a STM to ATM terminal adapter, Bharucha et al.

Patent Citation 8: 6,477,245 Method for the management of a telephone automatic branch exchange, external management device and corresponding automatic branch exchange, Chevet et al.

Patent Citation 9: 6,452,925 Universal access multimedia data network, Sistanizadeh et al.

[0003] **Definition List 1**

Term: ADSL

Definition: Asymmetric Digital Subscriber Loop

Term: aka

Definition: Also known as

Term: ATM

Definition: Asynchronous Transfer Mode

Term: DS1

Definition: Digital Signal 1 mode

Term: DS3

Definition: Digital Signal 3 mode

Term: DSL

Definition: Digital Subscriber Loop

Term: DSP

Definition: Digital Subscriber Loop

Term: DTC

Definition: Desk Top Computer

Term: EPABX

Definition: Electronic Private Automatic Branch Exchange

Term: Gbps, gbps

Definition: Giga Bits Per Second

Term: IP

Definition: Internet Protocol

Term: IPI

Definition: Internet Protocol Interface

Term: ISDN

Definition: Integrated Services Digital Network

Term: Kbps, kbps

Definition: Kilo Bits Per Second

Term: Mbps, mbps

Definition: Mega Bits Per Second

Term: OC3

Definition: Optical Carrier Type 3

Term: OC12

Definition: Optical Carrier Type 12

Term: OC48

Definition: Optical Carrier Type 48

Term: PABX

Definition: Private Automatic Branch Exchange

Term: PC

Definition: Personal Computer

Term: PCM

Definition: Pulse Code Modulation

Term: PVC

Definition: Permanent Virtual Circuit

Term: SDSL

Definition: Symmetric Digital Subscriber Loop

Term: SVC

Definition: Switched Virtual Circuit

Term: VDSL

Definition: Very (high-speed) DSL

Term: VOIP

Definition: Voice Over IP

Term: VOATM

Definition: Voice Over ATM

Term: xDSL

Definition: Some form of DSL

[0004] The present invention outlines a method and a system architecture that will allow broadband (several hundred kbps to several mbps) end user connections to an existing PABX or EPABX.

[0005] This patent describes the technology, architecture, methodology, high level hardware and software capabilities that will provide high bandwidth (broadband) end user connectivity to a PABX or EPABX. The current technology, architecture and the art in today's PABX or EPABX does not provide the end users more than 144 kbps connectivity that is provided via ISDN. The technology that is described in the patent will provide end users network connectivity that will be in excess of 2 mbps and thus allow high bandwidth services to these users. The services that they can avail themselves via this patented technology will be high speed data, image and video services, which today they have to access via alternate and expensive networks. Although the patent uses components that are currently available in the

public domain, the patent is being applied for the innovative, inexpensive architecture involving these technologies and components that so far have not been invented or used. There are several manifestations which can be devised to duplicate or implement the basic ideas and architectures described in this patent. As such, this patent will encompass claims that will prohibit such manifestations and implementations. It is the goal of this patent to cover all aspects of high speed broadband services and specific technology implementations that are described in this patent. It does not attempt to patent architectures and services related to Voice over Internet Protocol (VOIP) or Voice over ATM (VOATM) capability that is currently in use and may or may not have been patented. This patent will describe the architecture and technology via several diagrams as well as detailed descriptions of the interfaces that are being used innovatively in the architectures being patented and that have not been in the public domain to the best of knowledge of the inventor.

DESCRIPTION OF DRAWINGS

[0006] Figure 1 shows the main aspect of the patent which is the architecture of the system. Various items within the figure have been labeled numerically for reference purpose. [50] Is the existing PABX or EPABX. It contains all the hardware and software that is necessary to provide today's narrowband voice and data services. [40] Is the extension box or node to the PABX [50] that contains the hardware and software that will provide broadband services to the end users, which can be a Personal Computer (PC) or Desk Top Computer (DTC) or Integrated Digital Access Device [10], a Digital or Video or IP Phone [20] or an Integrated PC or DTC or Phone [30]. It is possible to connect other broadband high-speed access devices via [40]. The extension box or node [40] is connected to the PABX via some physical link connection that can be of a metallic copper type (coaxial of various types, twisted pair) [70] or can be optical [60]. Access devices [10], [20] or [30] are

connected to the extension box [40] via some form of metallic copper type physical link [70] as described above. The end users communicate broadband information among themselves or within the telecommunication or data communication network via the hardware and software provided within this architecture.

[0007] Figure 2 shows the various interfaces or hardware implemented within the extension box or node (Figure 1, [40]) of the new architecture. As described in the patent these can be of the type xDSL [80] of the type ADSL, VDSL, SDSL etc.; IP Interface (IPI) [90] that can be 10 mbps, 100 mbps or 1 gbps Ethernet or any higher speeds; Digital Interfaces (DS1 or DS3, ATM DS1 or DS3 [100] and Optical Interfaces (OC3 or OC12 or OC48 or higher speeds) shown as [110]. The end user devices shown (in Figure 1, [10], [20] or [30]) can be connected to the extension box (Figure 1, [40]) via some of these interfaces [80], [90] or [100]. The extension box itself can be connected to the PABX (Figure 1, [50]) via interface type [100] or [110].

[0008] Figure 3 shows the variation of the architecture being patented in which the broadband interfaces shown in Figure 2 are integrated within the PABX [50] rather than located in a separate (remote) extension box or node. In this architecture the broadband interfaces xDSL [80], IPI [90], Digital Interfaces of the type DS1 or DS3 or ATM DS1 or DS3 and others [100] and Optical Interfaces OC3 or OC12 or OC48 and others [110] are located or integrated within the PABX [50]. In either of the architectures there is no difference in the broadband services provided to the end users. The implementation of the architecture (in terms of hardware or software) may have minor variations to accommodate these architectural variations. [120] Shows the interface link between the PABX and the rest of the telecommunications or data communications network.

[0009] Both architectures are claimed as hitherto not invented in the realm of a PABX or EPABX system and as such claimed as a new invention.

BACKGROUND ART

[0010] PABX (Private Automatic Branch Exchange) or EPABX (Electronic Automatic Branch Exchange) have been in existence for several years. They have provided voice and low speed data services to a cluster of end users, typically in a business environment. They are referred to as a branch exchange because they provide similar services as a Central Exchange or a Central Office (aka Class 5 Exchange or Office within the hierarchy of North American telecommunications network) but are much smaller in size and most of the times provide a subset of services (hence the terminology "branch") that the larger system provides.

[0011] On the other hand PABXs provide certain unique voice and data services that are not typically provided within the larger Central Exchanges. There is a manifestation within a Central Exchange that mimics PABX services and is generally known as a Central Exchange with Centrex services.

[0012] Over the years the PABXs have evolved and have added new communication protocols, hardware and software technologies. These added capabilities, which are typically based on addition of computer technology and new electronics as well as software, have resulted in the elevation of the PABX (which originally started as electro-mechanical systems) to the new terminology of EPABX or Electronic PABX.

[0013] It will take several pages to describe the previous art of PABX and EPABXs. As such this patent cites certain public domain documents, books and patents that describe the art and anyone interested in the art can refer to these references.

[0014] The current art within the realm of PABX or EPABXs has been able to provide a plethora of voice (which is considered as a low speed information transmission) services and low speed data transmission services. With the advent of ISDN (Integrated Services Digital Network) technology a few years ago and its implementation within these systems, the data communication services within a PABX or EPABX have achieved a speed or bandwidth of 144 kbps. These services

are generally referred to as narrow band data services.

- [0015] No inventor or a business entity has made an attempt to come up with architecture for these PABXs or EPABXs that provides high speed (broadband) data, image and video services. These services generally start at several hundred kilobits per second (Kbps) and include services that utilize several megabits per second (Mbps).
- [0016] Although several manifestations of a PABX or EPABX exist in which some form of adjunct or extension or application processor box is used, these applications are generally used to provide new features and services to the end users and businesses. There has yet been no implementation, manifestation or application that provides high bandwidth connectivity from an end user to the PABX or EPABX.